

Record of Proceedings, Including Reasons for Decision

In the Matter of

Applicant Atomic Energy of Canada Limited

Subject Application to Approve the Construction of
Shielded Modular Above-Ground Storage
Buildings at the Chalk River Laboratories

Hearing
Date May 1, 2007

RECORD OF PROCEEDINGS

Applicant: Atomic Energy of Canada Limited

Address/Location: Chalk River Laboratories, Chalk River, Ontario, K0J 1J0

Purpose: Application to approve the construction of shielded modular above-ground storage buildings at the Chalk River Laboratories

Application received: March 16, 2006

Date(s) of hearing: May 1, 2007

Location: Canadian Nuclear Safety Commission (CNSC) Public Hearing Room, 280 Slater St., 14th. Floor, Ottawa, Ontario

Members present: L.J. Keen, Chair
M.J.M. McDill
A. Graham

Secretary: K. McGee
General Counsel: S. Maislin Dickson
Recording Secretary: S. Dimitrijevic

Applicant Represented By		Document Number
<ul style="list-style-type: none">• W.C.H. Kupferschmidt, General Manager, Decommissioning and Waste Management• D.S. Cox, Program Director, Waste Management and Decommissioning Project• J. McKenna, Facility Authority, waste Management Operations• R. Lesco, Site Engineering Head for CRL LaboratoriesR. Lounsbury, Licensing Manager for CRL Projects		CMD 07-H122.1
CNSC staff		Document Number
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Intervenors		Document Number
There were no interventions		

Licence: Approved
Date of Release of Decision: May 11, 2007

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Introduction

1. Atomic Energy of Canada Limited (AECL) has applied to the Canadian Nuclear Safety Commission¹ (CNSC) for the approval to construct six pre-fabricated Shielded Modular Above-Ground Storage Buildings (SMAGS) for the storage of low-level radioactive waste (LLRW) at the Chalk River Laboratories (CRL) Waste Management Area (WMA) “H”.
2. AECL proposed the construction of SMAGS to replace the previously approved design for the facility which would have involved the construction of up to ten metal-clad structures used for the Modular Above-Ground Storage (MAGS) facility. The proposed change would allow additional storage capacity and additional radiation shielding.
3. The waste management facility is operated under the current Chalk River Laboratories operating licence, NRTE-01.00/2011 (Operating Licence), whose licence conditions 4.1 and 4.2 preclude AECL from implementing the proposed change without prior authorization from the Commission. Should the Commission approve this construction application, the use of the SMAGS buildings would require a separate authorization.

Issues

4. In considering the application, the Commission was required to decide, pursuant to subsection 24(4) of the *Nuclear Safety and Control Act*² (NSCA):
 - a) if AECL is qualified to carry on the activity that the approval would authorize; and
 - b) if, in carrying on that activity, AECL would make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

Public Hearing

5. The Commission, in making its decision, considered information presented for a public hearing held on May 1, 2007 in Ottawa, Ontario. The public hearing was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*³. During the public hearing, the Commission received written submissions and heard oral presentations from CNSC staff (CMD 07-H122) and AECL (CMD 07-H122.1). There were no interventions.

¹ The *Canadian Nuclear Safety Commission* is referred to as the “CNSC” when referring to the organization and its staff in general, and as the “Commission” when referring to the tribunal component.

² S.C. 1997, c. 9.

³ S.O.R./2000-211.

Decision

6. Based on its consideration of the matter, the Commission concludes that AECL is qualified to carry on the activity that the approval will authorize. The Commission is also satisfied that AECL, in carrying on that activity, will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed. Therefore,

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act* and licence conditions 4.1 and 4.2 of the existing operating licence (NRTEOL-01.00/2011), approves the construction of Building no. 1 of the proposed series of six Shielded, Modular Above-Ground Storage buildings.

7. The Commission will consider a request for the approval for construction of the remaining five buildings upon further application by AECL.

Issues and Commission Findings

8. In making its decision, the Commission considered a number of issues relating to AECL's qualification to carry out the proposed activities and the adequacy of the proposed measures for protecting the environment, the health and safety of persons, national security and international obligations to which Canada has agreed.
9. The findings of the Commission presented below are based on the Commission's consideration of all of the information and submissions available on the record for the hearing.

Radiation Protection

10. AECL informed the Commission on radiation protection measures presented in their safety analysis report, a comprehensive safety analysis of the construction and operation of SMAGS buildings. The report considered normal operations as well as accidental situations under all reasonably predictable circumstances.
11. AECL also informed the Commission on the radiation protection policies set out in the AECL Radiation Protection Program, which documents principles and procedures to be followed on the CRL site. AECL stated that its safety record shows that the Waste Management Operations (WMO) personnel had no lost time accidents in the last five years and that predicted radiation doses for workers over the operational life of the SMAGS buildings fall well below regulatory limits, as well as collective radiation dose for all WMO staff in the CRL.

12. CNSC staff identified LLRW in two existing MAGS buildings and in the temporary “overspill” enclosure as principal sources of radioactive exposure during the construction of SMAGS buildings, and noted that radiation levels from these sources were well characterized and controlled. CNSC staff informed the Commission that the predicted radiation dose-rates would be well below the regulatory limits.
13. The Commission sought more information regarding frequency and duration of exposure of the SMAGS personnel to the radiation. AECL provided more details on the procedure of depositing radioactive material in MAGS and SMAGS buildings and duration of exposure of the involved workers.
14. With respect to the public safety, AECL informed the Commission that any conditions that could be adverse to public safety had been analysed and, where necessary, protective measures were implemented to mitigate the effects. Radiological releases from the buildings would be monitored and the whole monitoring program would make part of the monitoring program for the whole CRL site which is maintained to assess the radiation dose impact to the public.
15. The Commission considers the measures to be taken to limit radiation doses during the construction of the SMAGS facility to be acceptable.

Environmental Protection

16. AECL stated that it maintains an ISO-14001 compliant Environmental Management System, certified in 2004 and that the operation of SMAGS storage buildings would be managed in full compliance with AECL’s policy for protection of the environment. AECL informed the Commission that it has in place a follow-up program to determine if the environmental and cumulative effects of the SMAGS project would be as predicted and to verify effectiveness of implemented mitigation measures.
17. CNSC staff noted that the potential impacts from the SMAGS facility were identified and evaluated within the environmental assessment process. Information from that study is presented in the EA Screening Report attached to CMD 06-H113. The only outstanding concerns were related to the actual performance of the controls and mitigative measures to be implemented, in the case buildings are approved and constructed.
18. CNSC staff stated that, in its opinion, the SMAGS buildings’ systems, including ventilation and monitoring, are sufficient to minimize the possibility of contamination of the environment and to provide a safe working environment.
19. CNSC staff noted that it is anticipated that any airborne emissions to the environment from the SMAGS buildings will be below the threshold criteria which mandate regular monitoring. To confirm this, AECL has committed to monitor radionuclide concentrations in the buildings’ internal atmosphere during its initial stages of operation.

20. The Commission sought more details on the air monitoring of the ventilation system. AECL responded that the monitoring for contaminants, and particularly for tritium, is to be provided on a monthly basis and upon entry into the facility. Once the building has been filled, there would also be quarterly inspections carried out.
21. The Commission also sought more information on the monitoring of the structural integrity of the waste containers. In response, AECL provided more details on the materials used and the method of construction as well as on the waste storage procedure and monitoring of the waste containers. AECL stated that it was prepared to adopt new solutions and use new materials if needed and as they become available.
22. The Commission asked about AECL's ability to monitor contamination of ground water or leaks that might occur from the SMAGS facility. AECL noted that a monitoring system was in place and that test wells already exist in this area of the CRL site. CNSC staff expressed its satisfaction with respect to the adequacy of the environmental monitoring measures in place.
23. The Commission expressed its particular interest in tritium monitoring and its expectations from both AECL and CNSC staff with regard to high level of vigilance and environmental monitoring. The Commission noted that environmental protection should go beyond monitoring and should include provisions for the construction of the facility so that all previsible environmental impacts are minimized.
24. Based on this information, the Commission finds that AECL will continue to make adequate provision for the protection of the environment during the construction of the SMAGS building.

Conventional Health and Safety

25. AECL informed the Commission that all activities regarding construction of the SMAGS buildings will be conducted in accordance with AECL's Occupational Health and Safety Program. AECL stated that conventional safety hazards have been fully considered in preparation for this project.
26. CNSC staff informed the Commission that AECL has established a comprehensive policy for the protection of contract workers during the construction of the SMAGS buildings. Every person involved in the construction would be qualified as a *Nuclear Energy Worker*.
27. The applicable design requirements specify that the building design shall comply with AECL's Occupational Safety and Health Program and the Canada Labour Code and that the design shall incorporate a number of features to minimize conventional hazards and risks to workers engaged in operational activities. CNSC staff considered the proposed features and found them sufficient and acceptable.

28. The Commission inquired into the occupational health and safety impact of a seismic event when considering that the waste storage containers would be stacked in the SMAGS buildings. AECL responded that the safety analysis results demonstrate that the potential consequences were well within the safety case. CNSC staff responded that, considering the low probability of such an event and taking into account that the minimal occupational time of the building, the potential consequences would not pose an unreasonable risk.
29. The Commission is of the opinion that the conventional health and safety has been adequately addressed in the presented material.

Adequacy of Building Design

30. In its review of the SMAGS facility, the CNSC staff noted that the first building in the planned set of six had been designed to conform to the 1995 version of the National Building Code of Canada (NBCC 1995). CNSC staff noted that a gap analysis of requirements of the NBCC 1995 code with the newer version NBCC 2005 has demonstrated that the design of the first building meets the intent of the NBCC 2005 version. CNSC staff further noted that it has applied the criteria for snow, rain and wind loadings and the requirements for evaluating resistance to seismic induced forces from the newer version, NBCC 2005, and has required AECL comply with these criteria.
31. The Commission sought more detailed information regarding the gap analysis, and on compliance of the building design with the actual building code. AECL responded that the design of the first building *de facto* meets the requirements of the actual building code, but with a smaller safety margin. CNSC staff stated that this safety margin was acceptable.
32. The Commission further inquired whether AECL intended to apply the appropriate versions of the building code and standards at the time of design of the rest of the SMAGS buildings that are planned for construction over the next two decades. The Commission also asked if there should be any licence conditions in this respect. CNSC staff responded that, although it is common industry practice to do so, there was no specific condition to require the licensee to construct according to the latest versions of the codes. CNSC staff stated, however, that there was a commitment from AECL to comply with the code. CNSC staff also stated that it was ready to verify that each one of the buildings would be constructed in accordance with the latest version of the code.
33. The Commission asked whether the analysis of the building design included the effects of events that could potentially result in cracked buildings. AECL responded that its safety analysis report addressed the consequences of building failure and demonstrated that these consequences would be within the defined safety parameters. AECL explained the measures that would be taken in the case of seismic events and noted the methods used to repair damaged buildings.

34. CNSC staff noted the complementary hazard and risk analysis which has been conducted beyond the assigned basis assessment and informed the Commission on the potential consequences of structural damages due to the earthquake. These modeling results have shown that the radiation level increase at the nearest uncontrolled location would be less than 1 microSievert per hour ($\mu\text{Sv/h}$). The model also considered the release of solid waste from broken containers during a seismic event. Based on these evaluations, in CNSC staff's opinion, the potential effects of structural damage do not pose any unreasonable risks to the environment, the health and safety of persons or national security.
35. The Commission expressed its concerns over the open questions regarding the versions of the building code that would be applied in the design of various buildings. The Commission is not fully reassured by AECL and CNSC staff regarding the usual industry practice of applying the latest version of the building code and standards, and will take these concerns into account while evaluating the alternatives regarding the approval for construction of future SMAGS buildings. At that time, the Commission also expects to receive more detailed information regarding compliance with building codes.

Quality Assurance

36. AECL informed the Commission that the CRL WMAs are operated in accordance with the Operational Quality Assurance Program (Waste Management Operations Conduct of Operations), which compiles facility-specific procedures that define organization, responsibilities, processes and controls used to satisfy the requirements of *Nuclear Operations Quality Assurance Manual*. The facility operation is reviewed annually by the AECL Safety Review Committee, and the Program is subject to annual management review.
37. CNSC staff noted that although there are still certain outstanding issues that AECL needs to address to further improve its quality assurance program for the overall CRL site, it considers the existing program acceptable, on the grounds that the SMAGS facility poses only a relatively low risk to the environment, the health and safety of persons and to national security.
38. Considering past concerns with regard to AECL's quality assurance performance, the Commission asked whether any type of licence condition is necessary to ensure that AECL addresses the outstanding issues. CNSC staff responded that the current site licence already requires AECL to comply with the required standards, so that an additional licence condition was not deemed necessary. CNSC stated that the situation will be monitored through regular compliance activities, which will include quality assurance.

39. The Commission expects that AECL's quality assurance program and procedures fully comply with the requirements set out in the licence and that CNSC staff closely monitor this program area.
40. Based on the above information and considerations, the Commission concludes that AECL has in place the necessary quality assurance program to assure continued acceptable performance during the construction of the SMAGS building.

Emergency Preparedness and Fire Protection

41. AECL informed the Commission that SMAGS buildings would be fully integrated in the AECL's Emergency Preparedness Program. AECL stated that its emergency response program comprises radiation, chemical and fire hazards, and medical emergencies. The emergency procedures and response services are regularly evaluated through exercises, drills and self-assessment.
42. AECL informed the Commission that the basis for design of SMAGS buildings was National Building Code of Canada (NBCC), National Fire Code of Canada (NFCC) and the National Fire Protection Association (NFPA) Standard 801: Standard for Facilities Handling Radioactive Materials (2003).
43. AECL has submitted a third-party review of compliance for fire protection and a fire hazard analysis for the facility. CNSC staff was of the opinion that, although additional information and clarifications were needed, the construction of SMAGS buildings would not result in unreasonable risks to the environment or to the health and safety of persons.
44. The Commission is satisfied with the information provided on the emergency preparedness and fire protection for the proposed construction. However, the Commission expresses its concerns that the submitted material lacked information on issues and details of emergency response. The Commission expects more detailed information in support of an application for the use of the SMAGS buildings.

Security

45. CNSC staff informed the Commission on issues regarding security of the facility. CNSC staff stated that the facility is surrounded by a 2.4 m high perimeter fence and that gates and doors to the existing MAGS buildings are kept locked while the site is unattended, and security personnel patrols the area routinely.
46. The opinion of CNSC staff was that the SMAGS facility requires no special physical protection measures other than access control.

47. The Commission concludes that AECL has adequate provisions for ensuring the physical security of the SMAGS facility.

Decommissioning Plan and Financial Guarantee

48. CNSC staff informed the Commission that a Preliminary Decommissioning Plan specific to the SMAGS facility was in preparation. Decommissioning of SMAGS buildings would replace decommissioning of planned MAGS buildings, if the construction is approved, resulting in change to the estimated decommissioning cost. These factors will be taken into account in the revision of the Comprehensive Preliminary Decommissioning Plan for the entire CRL site, which will be made prior to the renewal of the current CRL operating licence.
49. The Commission sought more precise information with respect to the finalisation of the decommissioning plan. CNSC staff and AECL confirmed that the finalisation of the plan is expected in a few months and that the plan will include all six SMAGS buildings.
50. The Commission is satisfied that the preliminary decommissioning plan will be in place in time for application for approval of the use of SMAGS facilities.

Public Information

51. AECL and CNSC staff informed the Commission that they have consulted extensively with the public and other government departments during the development of the proposal for the SMAGS facility and in the preparation of the environmental assessment.
52. The Commission sought more information on public consultation procedure and asked if all potentially interested intervenors had the opportunity to express their concerns. Both, CNSC staff and AECL responded positively.
53. The Commission pointed out the increasing public interest for the problems of radioactive waste management and stressed the importance of consultation with interested communities with respect to this matter.

Safeguards and Non-Proliferation

54. The Commission was informed by CNSC staff that the applicability of Safeguards' requirements to the LLRW to be stored in the SMAGS buildings and to the measures which may be necessary to comply with the international obligations to which Canada has agreed, are the subject of discussions between CNSC staff and the International Atomic Energy Agency (IAEA). CNSC staff expressed the opinion that it was not

necessary that these aspects be resolved before approval for construction is granted. Should the decision be that the Safeguards' requirements do apply, then the measures would have to be implemented before authorization to operate is granted.

55. The Commission inquired whether there were any issues at this stage of the construction of this facility that would cause concern about the applicability and the integrity of CNSC safeguards approach. CNSC staff and AECL have assured the Commission that they understand the requirements and that they will work together to ensure the proper application of all required equipment, materials and procedures.
56. The Commission is of the opinion that CNSC staff and AECL should be looking at the safeguard requirements for these facilities within the broad plan of safeguard requirements for the entire CRL site.

Application of the *Canadian Environmental Assessment Act*

57. Pursuant to section 18(1) of the *Canadian Environmental Assessment Act* (CEAA), CNSC was required to ensure an EA screening of the proposed project was carried out.
58. The screening has been performed and the resulting Screening Report was considered by a Panel of the Commission at a hearing held on April 27, 2006. The Commission accepted the conclusions from the EA that the project, taking into account the mitigation measures identified in the Screening Report, is not likely to cause significant adverse environmental effects.
59. The Commission is satisfied that the requirements for an environmental assessment of the construction of SMAGS buildings have been fulfilled.

Conclusion

60. The Commission has considered the information and submissions of AECL and CNSC staff as presented in the material available for reference on the record.
61. The Commission concludes that the requirements of the CEAA for an environmental assessment of the construction of SMAGS have been fulfilled.
62. The Commission is satisfied that the licensee meets the requirements of section 24 of the *Nuclear Safety and Control Act*. That is, the Commission is of the opinion that AECL is qualified to carry on the activity that the approval will authorize and that it will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

63. The Commission therefore, pursuant to section 24 of the *Nuclear Safety and Control Act* and licence conditions 4.1 and 4.2 of the Operating Licence, approves the construction of Building no. 1 of the proposed series of six Shielded Modular Above-Ground Storage buildings.
64. The Commission will consider the approval for construction of other buildings on the basis of future applications, when AECL wishes to proceed with their construction.

Linda J. Keen,
President
Canadian Nuclear Safety Commission

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